IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of   Atty. Docket

OLIVER GERARD ET AL   FR 000095

Serial No.   Group Art Unit

Filed: CONCURRENTLY   Ex.

Title: METHOD AND SYSTEM FOR EXTRACTING SPINE GEOMETRICAL DATA

Commissioner for Patents
Washington, D.C.   20231

PRELIMINARY AMENDMENT

Sir:

Prior to calculation of the filing fee and examination, please amend the above-identified application as follows:

IN THE CLAIMS

Please amend the claims as follows:

3.   (amended)   A method as claimed in claim 1, wherein the step for estimating the spine outlines comprises estimating the best paths as lowest cost paths linking points selected by a contour detection operation optimizing a cost function composed of a local cost favoring the points having intensity characteristics that are optimum in the direction orthogonal to the spine centerline and a transition cost which constrains the path to go smoothly from one point to a next point.

5. (amended) A method as claimed in claim 3, wherein digitized guide-points are added to the found outline points to compel the best paths to go through them.

6. (amended) A method as claimed in claim 1, further comprising steps of processing said 2-D rectangular image band image data in order to estimate spine endplates locations using the data of one corresponding found spine outline.

9. (amended) A method as claimed in claim 7, further comprising steps of:

- constructing a first and a second cost profiles for the upward and downward directions, at locations along the spine center line,
- determining the up-endplates and down-endplates locations as respective minimum of the first and the second cost profiles, said locations being referred to as nodes.

11. (amended) A method as claimed in claim 6, further comprising steps of determining points of the spine, referred to as corners of vertebrae, located at the intersection of the outlines and the endplates.

13. (amended) A method as claimed in claim 1, comprising previous normalization of the point gradients within a range of gradient values to compensate for possible undue differences of brightness in regions of the original image.

14. (amended) An imaging system having acquisition means for acquiring images of the spine, having display means to display said images, having interactive drawing means to digitize the spine center line, the end points and guide points, having storage means to store the initial knowledge and database knowledge, storage means to store image data, and having processing means to carry out a method as claimed in claim 1.

16. (amended) A medical examination apparatus having the system of claim 14.

17. (amended) A computer program product comprising a set of instructions for carrying out the method as claimed in claim 1.
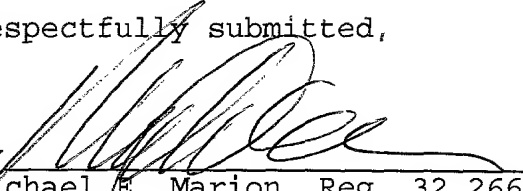
<div align="center">REMARKS</div>

The foregoing amendments to the claims were made solely to avoid filing the claims in the multiple dependent form so as to avoid the additional filing fee.

The claims were not amended in order to address issues of patentability and Applicants respectfully reserve all rights they may have under the Doctrine of Equivalents. Applicants furthermore

reserve their right to reintroduce subject matter deleted herein at a later time during the prosecution of this application or continuing applications.

Respectfully submitted,

By

Michael E. Marion, Reg. 32,266
Attorney
(914) 333-9641

3. (amended) A method as claimed in ~~one of Claims 1 or 2~~claim 1, wherein the step for estimating the spine outlines comprises estimating the best paths as lowest cost paths linking points selected by a contour detection operation optimizing a cost function composed of a local cost favoring the points having intensity characteristics that are optimum in the direction orthogonal to the spine centerline and a transition cost which constrains the path to go smoothly from one point to a next point.

5. (amended) A method as claimed in ~~one of Claims 3 or 4~~claim 3, wherein digitized guide-points are added to the found outline points to compel the best paths to go through them.

6. (amended) A method as claimed in ~~one of Claims 1 to 5~~claim 1, further comprising steps of processing said 2-D rectangular image band image data in order to estimate spine endplates locations using the data of one corresponding found spine outline.

9. (amended) A method as claimed in ~~one of Claims 7 or 8~~claim 7, further comprising steps of:

• constructing a first and a second cost profiles for the upward and downward directions, at locations along the spine center line,

- determining the up-endplates and down-endplates locations as respective minimum of the first and the second cost profiles, said locations being referred to as nodes.

11. (amended) A method as claimed in ~~one of Claims 6 to 10~~claim 6, further comprising steps of determining points of the spine, referred to as corners of vertebrae, located at the intersection of the outlines and the endplates.

13. (amended) A method as claimed in ~~one of Claims 1 to 12~~claim 1, comprising previous normalization of the point gradients within a range of gradient values to compensate for possible undue differences of brightness in regions of the original image.

14. (amended) An imaging system having acquisition means for acquiring images of the spine, having display means to display said images, having interactive drawing means to digitize the spine center line, the end points and guide points, having storage means to store the initial knowledge and database knowledge, storage means to store image data, and having processing means to carry out a method as claimed in ~~one of Claims 1 to 13~~claim 1.

16. (amended) A medical examination apparatus having the system of ~~one of Claims 14 or 15~~claim 14.

17. (amended) A computer program product comprising a set of instructions for carrying out the method as claimed in ~~one of~~ ~~Claims 1 to 13~~claim 1.